Document ID: EDF-3778
Revision ID: 0
Effective Date: 02/022004

Engineering Design File

PROJECT NO. 23083

Earthwork Quantities for Subproject 6, OU 3-13, Group 3–Other Surface Soils Project

Idaho National Engineering and Environmental Laboratory

Form 412.14
10/9/2003
Rev. 05

EDF No.: 3778 EDF Rev. No.: 0 Project File No.: 23083

1. Title: Earthwork Quantities for Subproject 6, OU 3-13, Group 3–Other Soils Project

2. Index Codes:

Building/Type Roads & Grounds SSC ID NA Site Area INTEC

3. NPH Performance Category: _____ or ☒ N/A

4. EDF Safety Category: CG or ☐ N/A SCC Safety Category: CG or ☐ N/A

5. Summary:

This project represents seven sites where Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) soils will be removed and hauled to the INEEL CERCLA Disposal Facility (ICDF) landfill. This Engineering Design File (EDF) documents the estimated volumes of soil and debris to be removed from these sites. The design grades and boundary dimensions were provided by the Waste Area Group 3 project. This EDF also estimates the backfill required to fill the excavation to design grades. Backfill materials will be uncontaminated salvaged soil from some of the sites. Additional fill material will be obtained from the Test Reactor Area (TRA) pit, which is located across Lincoln Boulevard from the Idaho Nuclear Technology and Engineering Center (INTEC). Estimates are based on excavation to the lines and grades shown on the plans.

A basic assumption of this EDF is that all excavated soil will exceed the remedial action objectives and will be disposed of at the ICDF.

The sites to be remediated under this project are:

- CPP-92, 98, and 99 (combined as one site)
- CPP-97
- CPP-34A
- CPP-34B
- CPP-3
- CPP-67 Pond 1
- CPP-67 Pond 2.

Five of these sites are inside the INTEC boundary and four are outside the boundary. See the map in Appendix A for the site locations.

Sites CPP-92, -98, and -99 consist of CERCLA soils and waste stored in boxes. These boxes will be removed intact and hauled for disposal at the ICDF landfill. The actual number of boxes and waste contents are listed in the project specifications.

Site CPP-97 has two stockpiles of soil. Both stockpiles are covered with tarps to prevent erosion and moisture infiltration. These tarps will be removed and the stockpiled soil will be hauled to the landfill.

After the stockpiles are removed, approximately 1/2 ft of contaminated surface soil will be excavated from the site and disposed of at the ICDF. The area will then be backfilled with pit-run gravel from the TRA pit. This soil has been included in CPP-97 quantities.

Sites CPP-34A and CPP-34B are areas where contaminated soil was placed below the ground surface. This project will excavate the soils and haul them to the ICDF landfill. The estimated depth of excavation in these areas varies from 20–22 ft. Once the waste soils have been removed, the excavated areas will be backfilled with clean, pit-run gravel and shaped to the existing contours. Existing topographic features will be removed for excavation and replaced after the backfill of the excavated areas is completed.

Site CPP-3 is located east of Building CPP-603 on the inside of the plant. Contaminated soils will be excavated approximately 2 ft below the ground surface and hauled to the ICDF landfill. The excavated area will then be filled to the natural ground surface with clean, pit-run gravel. Certain topographic

EDF No.: 3778 EDF Rev. No.: 0 Project File No.: 23083

1. Title: Earthwork Quantities for Subproject 6, OU 3-13, Group 3–Other Soils Project

2. Index Codes:

Building/Type Roads & Grounds SSC ID NA Site Area INTEC

Summary (continued)

features such as the railroad tracks, railroad car puller, and some underground conduit will be removed, disposed of, and not replaced. Other features such as the road and ditches will be replaced after the backfill is complete.

Sites CPP-67 Pond 1 and Pond 2 are the old percolation ponds just south of the plant. It is planned to excavate the contaminated soils 2 ft below the bottom of the ponds. The waste soil will be removed and hauled to the ICDF landfill. The side slopes will be flattened to a 4-to-1 slope by backfilling with pit-run gravel. The top 6 in. of the filled slopes and pond floor will be covered with topsoil. The topsoil will then be fertilized and seeded with native vegetation. The vegetation will be natural to the area and prevent the growth of weeds.

Other than the boxed soil in Sites CPP-92, -98, and -99, earthwork excavation quantities were calculated using TERRAMODEL computer software. The resulting quantities are volumes measured in cubic yards. Since the excavation will be paid for by the ton, it is necessary to convert the volumes to weight. This was performed by estimating a unit weight of the in-place soil at the particular site, estimating a percent compaction, and then calculating an adjusted unit weight of the soil for the area. Multiplying the excavated volume of soil in cubic yards by the adjusted unit weight converts the volumes to tons. A summary of the calculated quantities is given in the following table.

	Excavation		Borrow (In-Place)		
Site	Volume (yd^3)	Weight (Tons)	Gravel (yd^3)	Topsoil (yd^3)	Total Borrow (yd^3)
CPP-97	2,429	3,937	955	—	955
CPP-34A	46,023	79,620	46,023	—	46,023
CPP-34B	14,926	25,822	14,926	—	14,926
CPP-3	5,835	10,094	5,835	—	5,835
CPP-67 Pond 1	11,047	19,111	11,636	3,952	15,588
CPP-67 Pond 2	18,838	32,590	17,710	6,052	23,762

A small contingency has been added to the earthwork quantities to compensate for unforeseen irregularities that could occur in construction. This contingency will help to offset some change in quantities, unit weights, shrink, and swell factors.

Pit-run gravel will be obtained from the TRA pit in all areas except for CPP-67 Pond 1 and Pond 2. There are currently two soil/gravel stockpiles adjacent to CPP-67 Pond 1 and Pond 2. The material in these stockpiles will be used to backfill the percolation ponds and flatten the slopes. Stockpile #1 has an in-place volume of 20,000 yd^3, whereas Stockpile #2 has an in-place volume of 40,000 yd^3. There are 29,346 yd^3 required for the backfill for CPP-67 Pond 1 and Pond 2. All the material will be used in Stockpile #1 and the remainder required will be obtained from Stockpile #2. The 10,004 yd^3 of topsoil cover will be obtained from the Boiling-Water Reactor Experiment (BORAX) pit, located near the Radioactive Waste Management Complex.

Copies of the computer printouts and the calculated conversion from cubic yards to tons for the various sites are attached in Appendix B.

EDF No.: 3778 EDF Rev. No.: 0 Project File No.: 23083

1. Title: Earthwork Quantities for Subproject 6, OU 3-13, Group 3–Other Soils Project

2. Index Codes:
Building/Type Roads & Grounds SSC ID NA Site Area INTEC

6. Review (R) and Approval (A) and Acceptance (Ac) Signatures:
(See instructions for definitions of terms and significance of signatures.)

	R/A	Typed Name/Organization	Signature	Date
Performer/ Author	A	Clinton O. Kingsford/3K16	Clinton Kingsford	1.28.04
Technical Checker	R	Kurt Fritz/3K16	Kurt Fritz	1/28/04
Approver	A	Vondell Balls/3K16	Vondell Balls	1/29/04
Requestor (if applicable)	Ac	Kim Rogers/3K16	Kim Rogers by COK	1.28.04
Doc. Control	AC	Annie Buttars / 3532	Annie Buttars	2/2/04

7. Distribution: (Name and Mail Stop) C. O. Kingsford, MS 3650; K. Fritz, MS 3650; V. Balls, MS 3650; K. Rogers, MS 3650.

8. Does document contain sensitive unclassified information? ☐ Yes ☒ No
If Yes, what category:

9. Can document be externally distributed? ☒ Yes ☐ No

10. Uniform File Code: 0250 Disposition Authority: ENV1-B-4-A
Record Retention Period: Cut off when superseded, obsolete or cancelled. Destroy 75 years after cutoff.

11. For QA Records Classification Only: ☐ Lifetime ☐ Nonpermanent ☐ Permanent
Item and activity to which the QA Record apply:

12. NRC related? ☐ Yes ☒ No

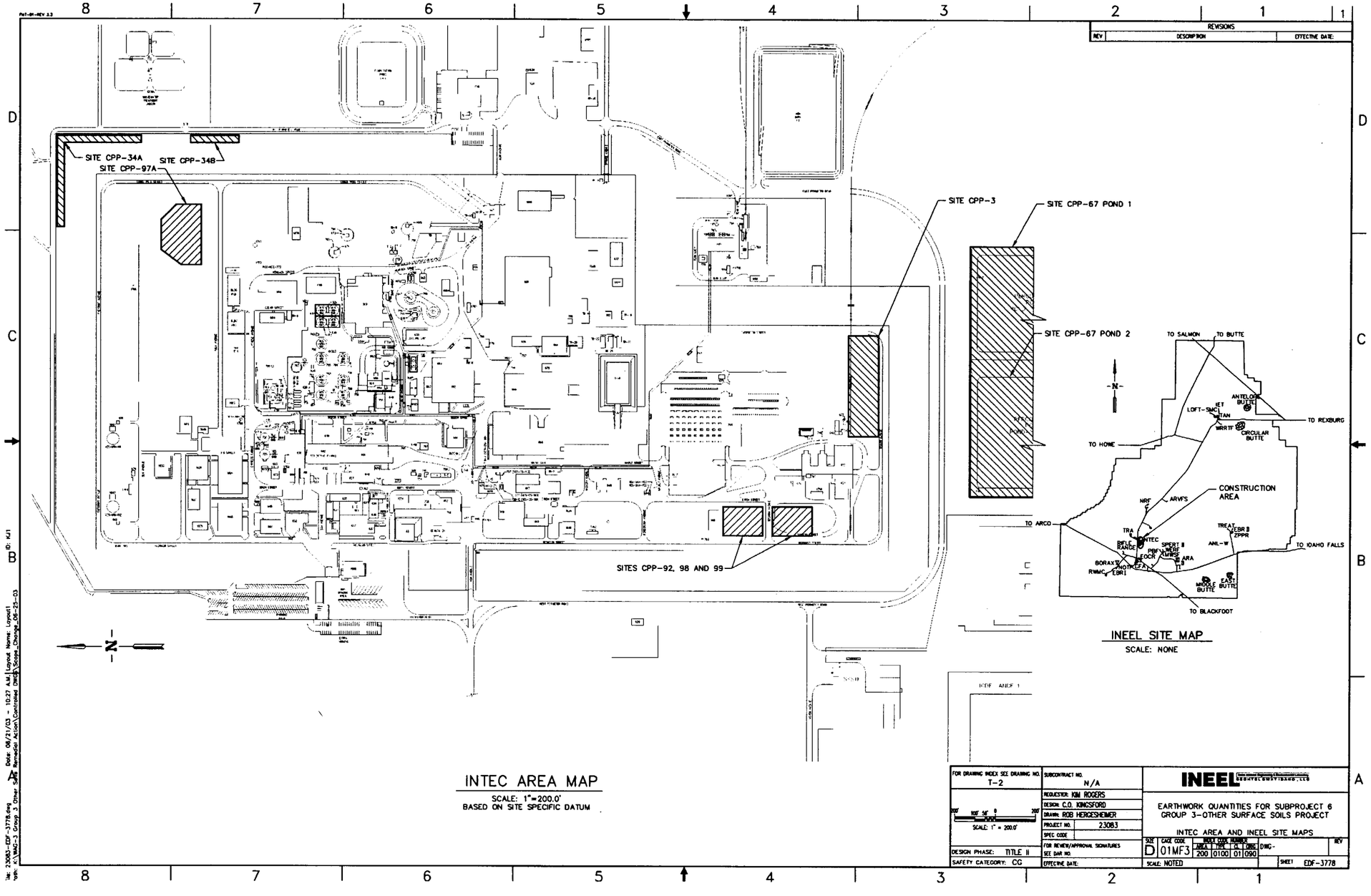
13. Registered Professional Engineer's Stamp (if required)

This page is intentionally left blank.

Appendix A

INTEC Area Map

This page is intentionally left blank.



INTEC AREA MAP
SCALE: 1"=200.0'
BASED ON SITE SPECIFIC DATUM

INEEL SITE MAP
SCALE: NONE

FOR DRAWING INDEX SEE DRAWING NO. T-2	SUBCONTRACT NO. N/A	INEEL
SCALE: 1" = 200.0'	REQUESTER: KIM ROGERS	EARTHWORK QUANTITIES FOR SUBPROJECT 6 GROUP 3-OTHER SURFACE SOILS PROJECT
	DESIGN: C.O. KINCSFORD	INTEC AREA AND INEEL SITE MAPS
	DRAWN: ROB HERGESHEIMER	SIZE D; CAGE CODE 01MF3; DRAWING NUMBER AREA 200 TYPE 0100 CA 01 DWG 090; REV
	PROJECT NO. 23083	SCALE: NOTED; SHEET EDF-3778
DESIGN PHASE: TITLE II	SPEC CODE	
SAFETY CATEGORY: CG	FOR REVIEW/APPROVAL SIGNATURES / SEE DAR NO. / EFFECTIVE DATE:	

This page is intentionally left blank.

Appendix B

Soil Weight Calculations

This page is intentionally left blank.

CPP-97

CPP-97 Excavation

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Tuesday, April 22, 2003, 2:23:09 PM

PROJECT: D:\Job Files\INTEC\GROUP 3 SOILS\eca areas.pro

DTM TO DATUM VOLUME (CPP-97 Large Stockpile)

Cut and Fill Volumes

Volume limited to boundary record 255411
Area within boundary: 6,854.4696 ft^2
Total triangulated area: 6,854.4696 ft^2

Shrinkage/swell factors: Cut 1.0000 Fill 1.0000

DTM Surface Layer Name	No. of Points	Datum Elevation
SITE 97	4,507	4,909.60

Volume Below Datum (yd^3)	Cumulative Volume Below Datum (yd^3)	Volume Above Datum (yd^3)	Cumulative Volume Above Datum (yd^3)
0.0	0.0	1,334.1	1,334.1

Net Difference: 1,334.1 yd^3 (excess volume above datum) × 1.05 (contingency) = 1,400 yd^3

Assume 85% compaction (loose stockpile)

Unit Weight = 135 lb/ft^3 × 0.85 = 114.8 lb/ft^3 × 27 ft^3/yd^3 = $\frac{3{,}098\ lb/yd^3}{2{,}000\ lb/ton} = 1.55\ \frac{tons}{yd^3}$

Large stockpile (1,400 yd^3 × 1.55 tons/yd^3 = 2,170 tons)	2,170	
Small stockpile	115	
0.5-ft Natural ground	1,652	
	3,937	tons

Excavation:	1,400	(large stockpile)
	74	(small stockpile)
Total	1,474	yd^3
0.5-ft Natural ground	955	yd^3 (surface excavation)
Grand Total	2,429	yd^3

CPP-97 Excavation

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Tuesday, April 22, 2003, 2:23:09 PM

PROJECT: D:\Job Files\INTEC\GROUP 3 SOILS\eca areas.pro

DTM TO DATUM VOLUME (CPP-97 Small Stockpile)

Cut and Fill Volumes

Volume limited to boundary record 256042
Area within boundary: 711.8353 ft^2
Total triangulated area: 711.8353 ft^2

Shrinkage/swell factors: Cut 1.0000 Fill 1.0000

DTM Surface Layer Name	No. of Points	Datum Elevation
SITE 97	4,507	4,910.00

Volume Below Datum (yd^3)	Cumulative Volume Below Datum (yd^3)	Volume Above Datum (yd^3)	Cumulative Volume Above Datum (yd^3)
0.1	0.1	54.1	74 (loose stockpile)*

* Assumed 37% increase for bulking

Volume – small stockpile: 74 yd^3

Weight: 74 yd^3 × 1.55 tons/yd^3 = 115 tons

CPP-97 Excavation

Given:

Figure below (Natural Ground Excavation)

Exc 1/2 ft under stockpiles (Jodi Bragassa—6•05•03)

Material in excess of 23 pCi/gram

Find:

Volume of contaminated soil in this area (see Figure 1)

Solution:

Area 1 $(675 - 525)(450 - 375) = 11{,}250\ ft^2$

Area 2 $(750 - 525)(375 - 350) = 5{,}625\ ft^2$

Area 3 $(750 - 450)(350 - 250) = 30{,}000\ ft^2$

Total $46{,}875\ ft^2$

Volume:

$46{,}875 \times \frac{0.5}{27} = 868\ yd^3 \times 1.10\ (\text{contingency}) = 955\ yd^3$

Weight:

$955\ yd^3 \times 1.73^*\ tons/yd^3 = 1{,}652\ tons$

NOTE: See CPP-34A for calculation of conversion factor.

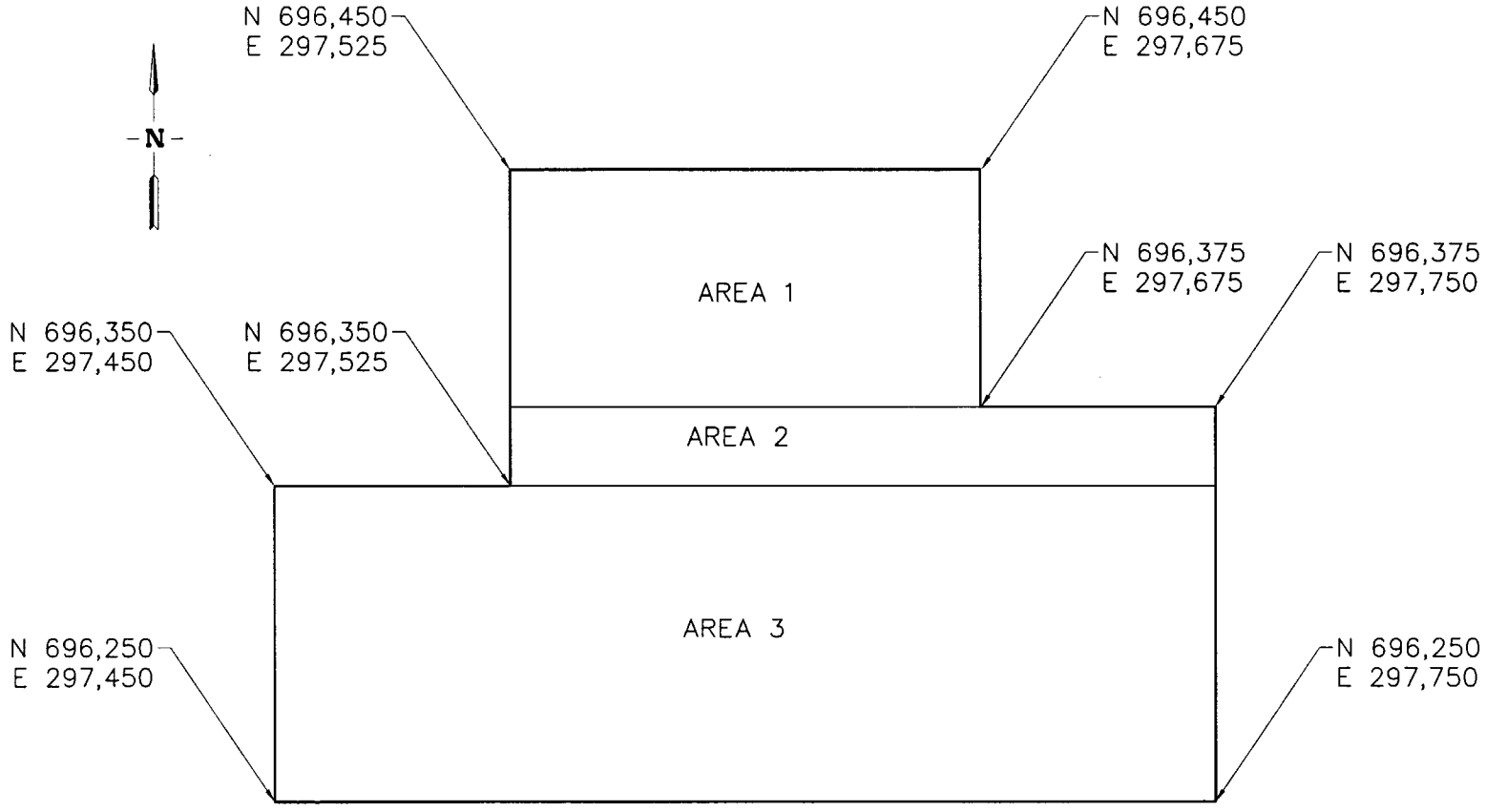


Figure 1. Area of 0.5 ft of excavation for CPP-97.

This page is intentionally left blank.

CPP-34A

CPP-34A Excavation and Backfill

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Tuesday, April 22, 2003, 1:12:20 PM

PROJECT: D:\Job Files\INTEC\GROUP 3 SOILS\eca areas.pro

DTM TO DTM VOLUME

Cut and Fill Volumes

Shrinkage/swell factors: Cut 1.0000 Fill 1.0000

Original DTM Layer Name	No. of Points	Final DTM Layer Name	No. of Points
Points INTEC XYZ	1,854	CPP34A Design	159

Cut Volume (yd^3)	Cumulative Cut Volume (yd^3)	Fill Volume (yd^3)	Cumulative Fill Volume (yd^3)
43,830.7	43,830.7	0.0	0.0

43,830.7 × 1.05 (contingency) = 46,023 yd^3 backfill (in place)

Assume 95% compaction and unit weight of 135 lb/ft^3

Adjusted unit weight: 0.95 × 135 lb/ft^3 = 128.3 lb/ft^3

Tons per yd^3: 128.3 lb/ft^3 × 27 × 1 ton/2000 lb = 1.73 $tons/yd^3$

Weight: 1.73 $tons/yd^3$ × 46,023 yd^3 = 79,620 tons

Totals

79,620 tons for excavation

46,023 yd^3 of backfill

CPP-34B

CPP-34B Excavation and Backfill

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Tuesday, April 29, 2003, 1:12:38 PM

PROJECT: D:\Job Files\INTEC\GROUP 3 SOILS\eca areas.pro

DTM TO DATUM VOLUME

Cut and Fill Volumes

Shrinkage/swell factors: Cut 1.0000 Fill 1.0000

Original DTM Layer Name	No. of Points	Final DTM Layer Name	No. of Points
POINTS INTEC XYZ	1,854	CPP34B DESIGN	70

Cut Volume (yd^3)	Cumulative Cut Volume (yd^3)	Fill Volume (yd^3)	Cumulative Fill Volume (yd^3)
14,214.4	14,214.4	0.0	0.0

14,214.4 × 1.05 (contingency) = 14,926 yd^3 backfill (in place)

Conversion to Tons:

Use 1.73 tons/yd^3 from CPP 34A

14,926 yd^3 × 1.73 tons/yd^3 = 25,822 tons excavation

Totals

25,822 tons for excavation

14,926 yd^3 of backfill

CPP-3

CPP-3 Excavation

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Monday, June 30, 2003, 8:24:43 PM

PROJECT: D:\Job Files\INTEC\GROUP 3 SOILS\eca areas.pro

DTM TO DATUM VOLUME

Cut and Fill Volumes

Volume limited to boundary record 125867
Area within boundary: 75000.0000 ft^2
Total triangulated area: 75000.0000 ft^2

Shrinkage/swell factors: Cut 1.0000 Fill 1.0000

Original DTM Layer Name	No. of Points	Final DTM Layer Name	No. of Points
POINTS SITE 03	414	CPP3 PTS –2 ft	414

Cut Volume (yd^3)	Cumulative Cut Volume (yd^3)	Fill Volume (yd^3)	Cumulative Fill Volume (yd^3)
5,555.6	5,555.6	0.0	0.0

Net Difference: 5555.6 yd^3 waste

5555.6 × 1.05 (contingency) = 5,835 yd^3 backfill (in place)

For excavation assume: 1.73 tons/yd^3 (from previous calculations)

5,835 yd^3 × 1.73 tons/yd^3 = 10,094 tons excavation

Totals

10,094 tons for excavation

5,835 yd^3 of backfill (in place)

CPP-67 Pond 1

CPP-67 Pond 1 Excavation Estimate

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Wednesday, July 30, 2003, 3:58:12 PM

PROJECT: D:\Job Files\INTEC\GROUP 3 SOILS\eca areas.pro

DTM TO DTM VOLUME

Cut and Fill Volumes

Volume limited to boundary named CPP67 Pond 1 Design
Area within boundary:144768.1240 ft^2
Total triangulated area: 144768.1240 ft^2

Shrinkage/swell factors: Cut 1.0000 Fill 1.0000

Original DTM Layer Name	No. of Points	Final DTM Layer Name	No. of Points
POINTS SITES 67	1,186	CPP67BMRGPTSDES	1,485

Cut Volume (yd^3)	Cumulative Cut Volume	Fill Volume (yd^3)	Cumulative Fill Volume
10,520.4	10,520.4	0.0	0.0

Net Difference: 10,520.4 yd^3 waste

10,521 yd^3 excavation
× 1.05 contingency
11,047 yd^3 of waste

Conversion from CPP-67 Pond 2: 1.73 tons/yd^3

Weight: 1.73 tons/yd^3 × 11,047 yd^3 = 19,111 tons

Summary
Borrow and Top Soil Quantities

CPP-67 Pond 1

Criteria:

- Backfill slopes to 4:1
- Included in slope backfill is 6 in. of topsoil
- In addition, 6 in. of topsoil is to be included on the bottom of the pond
- All quantities are in cubic yards.

Quantities:

1	2	3	4	5	6
Borrow 4:1 Slope	Topsoil 4:1 Slope	Pit Run Gravel 4:1 Slope (Column 1-2)	Topsoil on Bottom of Pond	Total Borrow (Columns 2+3+4)	Total Topsoil (Columns 2+4)
13,748	2,112	11,636	1,840	15,588	3,952

CPP-67 Pond 1 Sideslope Backfill Estimate

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Thursday, July 30, 2003, 7:44:11 AM

PROJECT: D:\Job Files\INTEC\GROUP 3 SOILS\eca areas.pro

DTM TO DTM VOLUME

Cut and Fill Volumes

Shrinkage/swell factors: Cut 1.0000 Fill 1.0000

Original DTM Layer Name	No. of Points	Final DTM Layer Name	No. of Points
CPP37BMRGPTSDES	1,485	CPP67B 4_1 SID	3,319

Cut Volume (yd^3)	Cumulative Cut Volume	Fill Volume (yd^3)	Cumulative Fill Volume
27.9	27.9	13,093.7	13,093.7

Net Difference: 13,065.8 yd^3 borrow

Subtract out topsoil estimate on side slopes

Pit Run Backfill on 4:1 Slopes:

13,094 yd^3
× 1.05 Contingency
13,478 yd^3 Total borrow on side slopes
NOTE: + 1,840 yd^3 Topsoil on bottom of pond
15,588 yd^3 Total borrow CPP-67 Pond 1

Pit Run Gravel on Side Slopes:

13,748 yd^3 Total borrow on side slopes
NOTE: – 2,112 yd^3 Top soil on side slopes
11,636 yd^3 Pit run on side slopes

NOTE: See next sheets for calculations.

CPP-67 Pond 1 Sideslope Bottom Area Estimate

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Thursday, July 31, 2003, 7:50:06 AM

PROJECT: D:\Job Files\INTEC\GROUP 3 SOILS\eca areas.pro

Layer: CPP67B 4_1 SID

Slope (%)	Planimetric Area (ft^2)	Surface Area (ft^2)
>100	2.48	8.20
100	53.25	61.38
50	103291.51	106531.47
20	2259.51	2279.83
10	364.90	366.60
9	405.98	407.40
8	657.56	659.52
7	4956.30	4966.83
6	6577.85	6587.65
5	2208.98	2211.41
4	9611.76	9617.70
3	7497.31	7499.67
2	18159.60	18161.19
1	28085.54	28086.24
0.5	14378.38	14378.50
0.25	1418.94	1418.94
Totals	199929.86 ft^2	203242.52 ft^2
		× 0.5 ft
		101,621 ft^3 → 3,764 yd^3
		× 1.05 Contingency
		3,952 yd^3 Total topsoil

Topsoil Needed on Side Slopes:

3,952 yd^3 Total topsoil
− 1,840 yd^3 Topsoil on pond bottom (next page)
2,112 yd^3 Topsoil on side slopes (4:1)

CPP-67 Pond 1 Bottom Area Estimate

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Thursday, July 31, 2003, 7:52:18 AM

PROJECT: D:\Job Files\INTEC\GROUP 3 SOILS\eca areas.pro

Layer: CPP67B BTM AREA

Slope (%)	Planimetric Area (ft^2)	Surface Area (ft^2)
>100	0.00	0.00
100	12.44	15.23
50	58.76	62.95
20	999.70	1010.00
10	181.73	182.56
9	392.04	393.42
8	579.52	581.24
7	4934.41	4944.90
6	6320.14	6329.55
5	2086.05	2088.34
4	9560.09	9566.01
3	7496.35	7498.71
2	18150.41	18152.00
1	27956.36	27957.06
0.5	14376.49	14376.60
0.25	1418.94	1418.94
Totals	94523.44 ft^2	94577.50 ft^2
		× 0.5 ft
		47,289 ft^3 → 1,752 yd^3
		×1.05 Contingency
		1,840 yd^3 Topsoil on bottom of CPP-67 Pond 1

CPP-67 Pond 2

CPP-67 Pond 2 Excavation Estimate

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Wednesday, July 30, 2003, 3:46:49 PM

PROJECT: D:\Job Files\INTEC\GROUP 3 SOILS\eca areas.pro

DTM TO DTM VOLUME

Cut and Fill Volumes

Volume limited to boundary named CPP67 Pond 2 Design
Area within boundary: 243167.5865 ft^2
Total triangulated area: 243167.5865 ft^2

Shrinkage/swell factors: Cut 1.0000 Fill 1.0000

Original DTM Layer Name	No. of Points	Final DTM Layer Name	No. of Points
POINTS SITES 67	1,186	CPP67AMRGPTSDES	1,523

Cut Volume (yd^3)	Cumulative Cut Volume	Fill Volume (yd^3)	Cumulative Fill Volume
17,940.5	17,940.5	0.0	0.0

Net Difference: 17,940.5 yd^3 Waste

17,941 yd^3 excavation
× 1.05 contingency
18,838 yd^3 of waste

Assume 95% compaction in pond area and 135 lb/ft^3 maximum unit weight

Adjusted unit weight: 0.95 × 135 lb/ft^3 = 128.3 lb/ft^3

Tons/yd^3: 128.3 lb/ft^3 × 27 ft^3/yd^3 × 1 ton/2000 lb = 1.73 tons/yd^3

Weight: 1.73 tons/yd^3 × 18,838 yd^3 = 32,590 tons

Summary
Borrow and Top Soil Quantities

CPP-67 Pond 2

Criteria:

- Backfill slopes to 4:1
- Included in slope backfill is 6-inches of topsoil
- In addition, 6-inches of topsoil to be included on the bottom of the pond
- All quantities are in cubic yards.

Quantities:

1	2	3	4	5	6
Borrow 4:1 Slope	Topsoil 4:1 Slope	Pit Run Gravel 4:1 Slope (Column 1-2)	Topsoil on Bottom of Pond	Total Borrow (Columns 2+3+4)	Total Topsoil (Columns 2+4)
20,316	2,606	17,710	3,446	23,762	6,052

CPP-67 Pond 2 Sideslope Backfill Estimate

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Wednesday, July 30, 2003, 4:11:21 PM

PROJECT: D:\Job Files\INTEC\GROUP 3 SOILS\eca areas.pro

DTM TO DTM VOLUME

Cut and Fill Volumes

Shrinkage/swell factors: Cut 1.0000 Fill 1.0000

Original DTM Layer Name	No. of Points	Final DTM Layer Name	No. of Points
CPP37AMRGPTSDES	1,523	CPP67A 4_1 BCKFL	39,886

Cut Volume (yd^3)	Cumulative Cut Volume	Fill Volume (yd^3)	Cumulative Fill Volume
8.5	8.5	19,348.4	19,348.4

Net Difference: 19,339.9 yd^3 borrow

Subtract out topsoil estimate on side slopes.

Pit Run Backfill on 4:1 Slopes:

19,349 yd^3
× 1.05 Contingency
20,316 yd^3 Total borrow on side slopes
NOTE: + 3,446 yd^3 Topsoil on pond bottom
23,762 yd^3 Total borrow CPP-67 Pond 2

Pit Run Gravel on Side Slopes:

20,316 yd^3 Total borrow on side slopes
NOTE: – 2,606 yd^3 Topsoil on side slopes
17,710 yd^3 Pit run on side slopes

NOTE: See next sheets for calculations.

CPP-67 Pond 2 Sideslope Bottom Area Estimate

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Thursday, July 31, 2003, 7:37:02 AM

PROJECT: D:\Job Files\INTEC\GROUP 3 SOILS\eca areas.pro

Layer: CPP67A 4_1 BCKFL

Slope (%)	Planimetric Area (ft^2)	Surface Area (ft^2)
>100	2.87	14.16
100	2.67	3.25
50	127957.54	131904.64
20	366.02	368.60
10	384.24	386.04
9	587.45	589.41
8	46.51	46.65
7	2.42	2.42
6	574.96	585.83
5	49.61	49.67
4	26.68	26.70
3	462.96	463.10
2	2372.54	2372.75
1	40507.66	40508.70
0.5	75706.10	75706.57
0.25	58200.18	58200.24
Totals	307250.44 ft^2	311218.71 ft^2

× 0.5 ft

155,609.5 ft^3 → 5,764 yd^3 Topsoil

× 1.05 Contingency

Total Topsoil: 6,052 yd^3

Topsoil Needed on Side Slopes:

6,052 yd^3 Total topsoil
– 3,446 yd^3 Topsoil on pond bottom (next page)
2,606 yd^3 Topsoil on side slopes (4:1)

CPP-67 Pond 2 Bottom Area Estimate

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Thursday, July 31, 2003, 7:55:32 AM

PROJECT: D:\Job Files\INTEC\GROUP 3 SOILS\eca areas.pro

Layer: CPP67A BTM AREA

Slope (%)	Planimetric Area (ft^2)	Surface Area (ft^2)
>100	0.00	0.00
100	0.00	0.00
50	22.95	23.74
20	4.89	4.96
10	1.45	1.46
9	8.18	8.21
8	1.27	1.28
7	0.00	0.00
6	0.00	0.00
5	0.00	0.00
4	0.00	0.00
3	447.43	447.57
2	2318.55	2318.75
1	40485.73	40486.77
0.5	75706.10	75706.57
0.25	58200.21	58200.26
Totals	177196.76 ft^2	177199.55 ft^2

$\times$ 0.5 ft

88,600 ft^3 $\rightarrow$ 3,282 yd^3

$\times$ 1.05 Contingency

3,446 yd^3 Topsoil on bottom of CPP-67 Pond 2

Stockpile #1
at CPP-67

Stockpile #1

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Thursday, April 17, 2003, 12:20:10 PM

PROJECT: D:\flyover data\2002 flyover (INTEC)\2002 INTEC Flyover 27_29.pro

DTM TO DATUM VOLUME

Cut and Fill Volumes

Volume limited to boundary record 280325
Area within boundary: 58811.9073 ft^2
Total triangulated area: 58811.9073 ft^2

Shrinkage/swell factors: Cut 1.0000 Fill 1.0000

DTM Surface Layer Name	No. of Points	Datum Elevation
2002 F/O DTM All	235,885	4,918.00

Volume Below Datum (yd^3)	Cumulative Volume Below Datum (yd^3)	Volume Above Datum (yd^3)	Cumulative Volume Above Datum (yd^3)
0.0	0.0	20,370.0	20,370.0

Net Difference: 20370.0 yd^3 excess volume above datum

Small pile south of east pond:

Assume 20,000 yd^3

Stockpile #2
at CPP-67

Stockpile #2

Bechtel BWXT Idaho, LLC
2525 N. Fremont, PO Box 1625
Idaho Falls, ID 83415-3650
208-526-4914
Thursday, April 17, 2003, 12:36:45 PM

PROJECT: D:\flyover data\2002 flyover (INTEC)\2002 INTEC Flyover 27_29.pro

DTM TO DATUM VOLUME

Cut and Fill Volumes

Volume limited to boundary record 831404
Area within boundary: 296410.2435 ft^2
Total triangulated area: 296410.2424 ft^2

Shrinkage/swell factors: Cut 1.0000 Fill 1.0000

DTM Surface Layer Name	No. of Points	Datum Elevation
2002 F/O DTM All	235,885	4,920.00

Volume Below Datum (yd^3)	Cumulative Volume Below Datum (yd^3)	Volume Above Datum (yd^3)	Cumulative Volume Above Datum (yd^3)
2,907.9	2,907.9	40,649.1	40,649.1

Net Difference: 37741.3 yd^3 excess volume above datum

Large pile:

Assume 40,000 yd^3